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SCHEDULE OF MEETINGS

14 April - 5 May	**Training Course in Recent Techniques in Management of Poliomyelitis Patients, Copenhagen**
2 - 7 May	**Meeting on Classification of Diseases and Problems of Medical Certification in America, Caracas**
9 May - 20 June	**International Tuberculosis Training Centre, Istanbul : Training Course for Physicians**
10 May	**Eighth World Health Assembly, Mexico City**
	Executive Board, sixteenth session, Mexico City (following closure of the Health Assembly)
9-28 May	**Training Course in Occupational Health, Paris**
16 May - 27 June	**Training Course in Insect Control, Rome and Latina**
6-10 June	**Advisory Group on Veterinary Public Health, Geneva**
9-22 June	**Third Inter-American Statistical Conference, Rio de Janeiro**

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INTERNATIONAL CO-OPERATION IN THE DEVELOPMENT OF PEACEFUL USES OF ATOMIC ENERGY

The development of peaceful uses of atomic energy was given new impetus in December 1954 when the General Assembly of the United Nations adopted a resolution promoting international co-operation in this domain. The General Assembly expressed the belief that " the benefits arising from the momentous discovery of atomic energy should be placed at the service of mankind ", to ameliorate living conditions, to assist in " lifting the burdens of hunger, poverty, and disease ". It encouraged the early establishment of an international atomic energy agency and authorized the convening of an international technical conference on atomic energy.

A committee of representatives of seven governments was set up to advise the Secretary-General of the United Nations on preparations for the conference. In an opening statement to this advisory committee, which met in January 1955, the Secretary-General emphasized the importance of atomic energy for technical progress and of the sharing by all of the results of its practical application to the peaceful needs of man. The discovery of atomic energy, he said, was the result of highly specialized research in the most technically advanced countries. But, he pointed out, atomic energy is a property of nature itself; and, as such, it belongs to all peoples.

WHO has, for some time, been aware of its new responsibilities with regard to atomic energy in relation to medicine and public health. On the suggestion of the Government of Austria, the WHO Executive Board, at its thirteenth session, requested the Director-General to study the subject of international regulations for the protection of workers and the general public against roentgen and isotopic radiations. This study is being made, in consultation with the international organizations concerned and with Member States.

With the passing of the aforementioned resolution by the United Nations General Assembly and an invitation to WHO to participate in the technical conference, the interest of the Organization in the broader medical and public health aspects of atomic energy became a matter for urgent action. Accordingly, the Director-General convened, in mid-December 1954, a consultant group on atomic energy.[1] This group of four consultants—three of them heads of medico-biological departments in national atomic energy commissions or similar bodies, and the fourth a physicist with special knowledge of the biological aspects of radiation—supplied the Director-General with information on present and future possibilities for the use of atomic energy in medicine and on problems of health protection against radiation, and suggested the role of WHO in relation to the future developments which might be expected. The report of the consultant group served as the basis for a preliminary note on the peaceful uses of atomic energy in medicine and public health which the Director-General submitted to the advisory committee through the Secretary-General of the United Nations.

[1] *Chron. Wld Hlth Org.*, 1955, 9, 24

At its fifteenth session, in January-February 1955, the WHO Executive Board discussed the Organization's part in helping to promote international co-operation in the medical uses of atomic energy and recognized that new scientific developments in this field would undoubtedly " deeply influence the programme of work of the Organization ". It endorsed the preliminary action taken by the Director-General and authorized further action with regard to participation in the conference and co-operation with, and assistance to, an international atomic energy agency, should such an agency be established.

Thus the ground has been prepared for co-operation on an international scale in the promotion of the development of peaceful uses of atomic energy, the discovery of which has ushered in what has been termed a " second industrial revolution ". Of immediate concern is the international conference on atomic energy, which is to take place in Geneva in August 1955. WHO is preparing its participation in the conference in liaison with the other United Nations specialized agencies, all of which have been invited to take part. The purpose of the conference and the high hopes with which it is being planned have been given eloquent expression by the Secretary-General of the United Nations in his opening statement to the advisory committee on its preparation:

" There have been many international conferences on pure and applied nuclear science in recent years that have contributed to a sharing of knowledge in this field. But this conference... is conceived as something different in kind and of very special significance. It is the first world-wide conference of governments in this field. Secondly, its results should—in the words of the Assembly resolution—'facilitate the use by the entire world of atomic energy for peaceful purposes'. I emphasize the word 'use'. Its proceedings should be primarily concerned with the practical application of atomic energy for power and other purposes...

" Of the more than eighty countries which are invited to the conference, relatively few have as yet been in a position to share in the development of atomic energy, or to benefit from the knowledge and skills of scientists and engineers trained in nuclear techniques. Thus, the coming conference can have a most important role to play in promoting that sharing of knowledge and ideas which is so necessary if the promise of atomic energy for the benefit of mankind is to be realized...

" For all, I hope, it will add strength to a spirit of co-operation transcending all that now so obviously divides the world, in the interest of that higher unity—mankind itself."

Arrangements for Yellow Fever Vaccination

The International Sanitary Regulations specify that an international certificate of vaccination against yellow fever is valid only if the vaccine used has been approved by WHO and if the vaccinating centre has been designated by the health administration for the territory in which that centre is situated. A recent supplement to the *Weekly Epidemiological Record* * gives information concerning arrangements for vaccination against yellow fever, summarizing the situation as on 11 February 1955. Following a statement showing the position of countries and territories under the International Sanitary Regulations, there are listed the centres designated by health administrations for the issue of international certificates of vaccination against yellow fever, the institutes manufacturing yellow fever vaccines approved by WHO, and yellow fever vaccine testing stations.

* *Wkly epidem. Rec.*, 1955, No. 6, Supp. 2.

ASSISTANCE TO EDUCATIONAL INSTITUTIONS

Early in its history, the World Health Organization recognized that a basic attack on the health problems of mankind could be launched only if there were adequate numbers of trained personnel available for this gigantic task. The Organization has therefore undertaken to encourage governments to establish and develop national educational institutes for health workers such as doctors, nurses, sanitarians, and others.

WHO has not sponsored the establishment of medical schools and colleges, but it has promoted surveys of professional education which, through long-range plans, may lead to the construction of new institutions. However, with respect to the development of existing teaching facilities, the Organization provides assistance in both material and personnel, the latter in the form of visiting professors.

Visiting professors

Educational institutions, through their governments, are impelled to ask WHO for assignment of visiting teachers under a variety of circumstances and for a number of reasons, prominent among which are:
(*a*) political and economic changes resulting in a sudden shortage of senior teaching personnel; (*b*) recognition of the necessity for creating full-time professorships in place of part-time teaching positions, especially in the pre-clinical subjects; (*c*) creation of a professorship in a subject not previously taught (this is so chiefly with respect to preventive and social medicine); and (*d*) the need for assimilation of the latest technical knowledge in a particular subject into the relevant teaching department.

The growth of this type of assistance may be noted in the figures below, which show the number of teaching assignments sponsored by WHO in the years 1952, 1953, and 1954, and the number of months spent in these assignments by the respective professors.

Year	*Number of teaching assignments*	*Number of "professor-months"*
1952	10	54
1953	22	177
1954	38	284
Total	70 *	515

* These 70 teaching assignments were actually carried out by 40 different individuals, most of them staying over the end of a calendar year.

The underlying purpose of the assignment of a visiting professor is to help an institution develop its own teaching staff. In each case, therefore, a counterpart teacher of the local faculty is designated to work with the WHO expert and usually succeeds the latter at the end of his stay. As the preparation of a professor is a lengthy process, often involving, among other things, a fellowship for foreign study, one of the problems facing WHO is a determination of the timing of various phases in individual projects. This in turn leads to the stimulation of long-range planning for institutions' development, including creation and financing of positions by the local authorities, the award of fellowships by WHO or other organizations or agencies, and the assignment of visiting professors.

Although the needs of educational institutions (especially in "underdeveloped" countries) have been known in general terms, a complete analysis has not been possible up to the present time. However, a listing, by subjects, of the assignments of visiting teachers from 1952 to 1954 gives some idea of these needs. Table I shows that the greatest deficiences in medical schools are in the

pre-clinical subjects. No trends can as yet be discerned in the other types of schools.

TABLE I. "PROFESSOR-MONTHS" DEVOTED TO VARIOUS SUBJECTS, 1952-1954 (INCLUSIVE)

	Number of "professor-months"	
Medical Schools		
Anatomy	17	
Biochemistry	16	
Physiology	43	
Microbiology (including Parasitology)	25	
Pathology	12	
Pharmacology	41	
Preventive and Social Medicine	42	
Paediatrics	7	
Administration (Principal of School)	24	
Total (Medical Schools)		227
Schools of Public Health		
Public Health Administration and Social Medicine	8	
Sanitary Engineering	17	
Microbiology (including Parasitology)	18	
Nutrition	16	
Industrial and Physiological Hygiene	44	
Statistics	17	
Maternal and Child Health	4	
Public Health Education	27	
Total (Schools of Public Health)		151
Institutions for Training Auxiliary Personnel		52
Schools of Physiotherapy		60
School of Tropical Medicine (Pharmacology)		25
Total		515

To help meet requests from countries, WHO has prepared a card file of experienced teachers who have expressed an interest in "foreign duty". The subjects in which these experts qualify are classified into 39 groups, of which four examples follow: (1) Bacteriology, Immunology, Serology, Virology; (2) Epidemiology, Biostatistics, Demography; (3) Pharmacology, Pharmacy, Therapeutics, Toxicology; and (4) Internal Medicine, Cardiology, Endocrinology, Haematology, Neurology. In addition, subjects such as Biochemistry, Dentistry, Hospital Administration, Radiology, Training of Auxiliary Personnel, Veterinary Medicine, etc. occupy classifications of their own. This arrangement is an aid which enables the Organization to call upon the resources of many countries in carrying on its world-wide programme.

On occasion, a short intensive project is felt to be advantageous in promoting the use of the latest techniques among the members of an educational institution's faculty. A number of eminent scientists are thus assigned for a few weeks as a visiting team to work with local counterparts (see page 139). In addition, WHO sponsors study groups and conferences in an attempt to stimulate the exchange of scientific information.

Equipment and supplies

Scientific subjects cannot be taught without adequate reference and demonstration materials. When WHO assigns teachers it therefore provides certain equipment and supplies. These may include: (1) medical and scientific literature; (2) laboratory apparatus (e.g., glassware and scientific instruments); (3) laboratory supplies (e.g., chemicals); and (4) diagnostic and therapeutic instruments used for teaching (e.g., microscopes, electrocardiographs, and physiotherapy apparatus).

The visiting professor trains his understudies in the proper use of the equipment. Maintenance service for such equipment is not always available, and the training of instrument mechanics for educational institutions may have to be given consideration in the future.

Inventories of teaching material

WHO, in co-operation with UNESCO, has prepared and published lists of equipment and supplies needed for the teaching of certain subjects in medical schools (see page 151). This publication describes both "required" and "desirable" items for the teaching of each subject. For every item the amount needed by a class of 40 students is given, and the percentage of annual replacement is estimated. The cost of each article is indicated

in order to give the reader some idea of the expense involved in establishing a new medical school or in reorganizing an existing one. Since the equipment pertaining to teaching has a close relationship to course content, a description of the curriculum by subject is also included with the equipment lists.

It is expected that these inventories will render a useful service by putting at the disposal of teachers a handy reference list, but there is no intention of " standardizing " equipment, course content, or teaching methods of medical schools. WHO maintains the position that medical education in each country is, and must continue to be, a reflection of the needs and resources of its culture and its social structure.

World directory of medical schools

WHO published, in 1953, a directory listing the medical schools of the world, 567 in all, giving certain data about them (in so far as information was available). Among the facts listed were year of foundation, dates of academic year, conditions for admission, size of teaching staff, total enrolment, annual number of admissions, language of instruction, duration of studies, degrees obtainable, annual number of graduates, and annual tuition fees.

The favourable reception accorded the first edition has led to an expansion of the information which is being collected for a second edition, due to be published in 1955. There is now on hand a brief narrative statement for each country which has at least one medical school, a total of about eighty countries. This national description of medical education will serve as a general introduction to the more specific data relating to individual schools.

An extension of this work to include categories of professional schools other than medical is now contemplated, so that directories of dental schools, veterinary schools, pharmacy schools, schools of public health, and others may eventually be compiled.

Training of auxiliary personnel

Although traditions of professional health workers ministering to the needs of people exist in most countries, there are many places where auxiliary (sub-professional) personnel perform the bulk of the work. As each country is in a different stage of development, it is necessary that at least the following three questions form the basis of a programme of assistance in training sub-professional personnel: (1) What kinds of auxiliaries are needed in different localities ? (2) How should those who are to train and supervise the auxiliaries be trained ? (3) How should the auxiliaries be trained ?

Some auxiliaries are best trained in the course of field projects, while others need more formal training as well. Many countries require the support of WHO in training auxiliaries, and this work has been incorporated into the programme of assistance to educational institutions.

WHO, the United Nations Social Commission, and UNICEF have all stressed the importance of training auxiliary personnel. However, it is necessary to keep in mind that the " production " of auxiliaries should correspond to the possibility of their useful employment. Any outside assistance in training should therefore be based on the preparedness of the government to make use of such personnel.

The training offered to auxiliary personnel in current WHO programmes in institutions in Burma, Ethiopia, and Nepal is being analysed in an attempt to determine: (*a*) basic similarities in their activities; (*b*) factors which determine the differences in their activities; and (*c*) principles which may be adapted to broader use. In addition, a WHO expert committee is expected to give this question close study in October 1955.

Curriculum standards

A curriculum is an educational plan and should be an expression of the steps whereby certain stated objectives are approached. It is important that an educational institution should define its goals in terms of the personnel needs of the community. WHO is stimulating wider appreciation of the fact that existing curricula of professional schools should be analysed in the light of acceptable principles, and assists institutions to adopt a more realistic policy of education and training.

Although certain minimum world-wide standards must be adhered to, especially where degrees are offered, it is not reasonable to establish a curriculum which merely copies that offered in another country. Each institution must reflect conditions in, and of, the society which it serves. In the formulation of a curriculum, many factors should be considered besides the relative importance of the several subjects. Among such factors are the prior preparation of the students, the stage of development of the institution and staff, and the capacity of the particular society to absorb advanced concepts.

Teaching methods and qualifications of teachers

The methods by which knowledge is disseminated are often as important in attaining educational goals as the substance itself. WHO studies and promotes the use of teaching techniques most appropriate under varying circumstances, such as lectures, seminars, case studies, conferences, unit plan assignments, practical laboratory and bedside work, and home visits. As more knowledge of educational psychology and the learning process becomes available, WHO will disseminate this valuable information throughout the academic world.

There is increasing recognition of the fact that neither technical or professional competence nor the performance of research necessarily means that a person appointed to an academic post is able to communicate knowledge, to stimulate students to learn for themselves, and to inspire high ideals in the practice of his profession. WHO is attempting, through consultation and advice, to promote an awareness of the qualities which should be developed in the future teachers of students in the health professions.

The " wholeness " of educational institutions

The concept of an educational institution as having a " unity " is growing in acceptance. The idea that a group of professors—of medical subjects, for example—each working in " splendid isolation " will necessarily produce a well-rounded, " integrated " doctor is not held to be as axiomatic as it once was. Furthermore, the orientation of medical education is now towards the whole person as he lives in his physical, psychological, and social environment, so that the co-operation and co-ordination of all departments of the medical school are needed. It is interesting to note that in the methods and techniques by which each institution strives towards this more or less universal goal lie their most striking differences. The individual character of a particular medical school can be reflected as much in its " unity " and its orientation towards the " whole " human being as in the calibre of its science courses and the extent of its research programme. WHO is promoting the wider discussion and acceptance of these concepts among medical educators.

The programme of assistance to educational institutions, therefore, is aimed at development in detail as well as on a broad front. Long-range planning must replace haphazard growth, often influenced in one or another direction by an outstanding personality; and the relationship of professional training to social and cultural factors must receive ever increasing consideration.

SOME IMPRESSIONS OF A MEMBER OF WHO VISITING MEDICAL TEAMS *

Visiting teams of medical scientists are voluntary projects always initiated by invitation from an official agency of a Member nation, usually the Ministry of Health. The host country invites WHO to send representatives in selected specialities to be the guests of the government. If the project is approved, WHO selects a travelling faculty of eight to fourteen international members and, in collaboration with a local preparatory committee, arranges the programming and time schedule of a visit of two weeks' to two months' duration. The visiting group is assured a cordial welcome by the local medical profession and the public.

Programmes are planned with three general objects in mind: to serve as an informal forum for discussion of health conditions, medical needs, and problems of medical education in the host country; to exchange scientific information and ideas; and to encourage friendly relations between visiting and local scientists.

To fulfil these purposes requires a heavy work schedule: formal lectures; clinical and pathological conferences; seminars and round table discussions; laboratory demonstrations, ward rounds, operations, and consultations; motion pictures, field trips, social functions, and " curbstone " discussions with local colleagues in various specialities, twelve to fourteen hours comprising the average work-day.

Up to the end of 1953, WHO and the Unitarian Service Committee of the United States, both separately and jointly, had sent international faculties to more than 70 universities in 17 foreign countries of South America, Europe, and Asia. A total of 175 men served on these visiting teams. They came from 45 American and from 20 non-American institutions. I have been on four such teams in Poland and Finland in 1948, the Netherlands and Sweden in 1950, Israel and Iran in 1951, and India in 1953.

I should like to give some reasons, based in part on personal experience, why I believe that, in the non-political sphere of health and medicine, international co-operation among groups of nations is more effective than any bilateral arrangements.

Free choice of a visiting faculty from all countries of the world is the best way to ensure professional competence. No nation has a monopoly on medical advances: insulin was discovered by a Canadian, penicillin by a Scotsman, streptomycin by an American, and DDT by a Swiss. Members of the four visiting teams to which I was assigned came from 21 universities in 9 countries. Two Nobel Prize winners in medicine—Dam, of Denmark, and Tiselius, of Sweden—took part in visiting team activities, and two others—Fleming, of the United Kingdom, and Heymanns, of Belgium—were members of the teams which visited Sweden, Iran, and India.

Recognition by the host country of the professional competence of these international faculties was manifested on many occasions. The Government of Israel requested the three public health representatives of the team, one Norwegian and two Americans, to act as official advisers on problems of immigration, sanitation, epidemiology,

* Adaptation of an address by S. Z. Levine, M.D., Professor of Pediatrics, Cornell University Medical College, and Pediatrician-in-Chief, New York Hospital, to the annual meeting of the Massachusetts Medical Society, Boston, 19 May 1954. This address was published in the *New Engl. J. Med.*, 1954, 251, 813.

and public health administration. The dean of the medical school in Teheran had all the lectures by members of the visiting team translated into the Persian language and published in book form for country-wide distribution to the doctors of Iran. The original manuscripts were in four languages.

The fact that WHO is strictly a technical body, free from all political and religious ties and international in its outlook, has gained for it the confidence and respect of nations in the East as well as in the West. Acceptance in the technical field of health of practical, effective international co-operation on all professional levels is extremely significant when viewed against the difficult political backgrounds of some countries.

The wide acceptance of visiting teams of WHO in academic and governmental circles of its Member nations establishes these projects as a valuable medium of world health promotion as well as a useful educational technique. It reflects the care with which WHO has picked its teams irrespective of origin or country, and the efforts put into preparatory planning, scheduling, and day-to-day operations while the team is in residence in the host country.

The personal contact, the informality of discussions, and the recognition by all participants, visiting and local, that the interchange of scientific information is in a real sense a two-way street of education remove the stigma of loss of face, encourage free and frank discussion, and can lead to friendly and often lasting relations. People the world over instinctively respond to visitors who treat their people as people and not as source material for the amassing of data and statistics.

Of no less importance are the benefits that accrue to the visitors themselves. The stimulus of living intimately for two months with foreign colleagues who have similar interests is great. Equally rewarding are the opportunities to talk to people from remote lands, to hear strange tales, to eat unfamiliar foods, to join in unusual social functions, to see exotic diseases, and to learn about foreign cultures.

But even more pervasive than specific memories is the over-all conviction that all the peoples of the world are essentially alike. Their basic desires are the same: to be healthy, to be free, to be respected, to have enough food to eat and enough clothes to wear, and to have shelter over their heads. Fulfilment of these basic needs brings hope and faith in its wake; without it there are pain and suffering, insecurity and despair.

In Iran, in India, and in other countries, Danish doctors are conducting antituberculosis campaigns by mass BCG inoculations, Italian public-health workers are helping to eradicate malaria with DDT, Swedish nurses are attending children in hospitals, and American immunologists are vaccinating babies against smallpox, all working together for world health promotion.

The investment in WHO is small indeed when measured against the huge returns of increased productive labour, higher standards of living, and world amity. WHO, in its global fight against disease, is doing its share to bring about world peace in an unobtrusive but highly practical way.

German Translation of International Pharmacopoeia

Volume I of the *Pharmacopoea Internationalis* is now available in German, a translation having been published recently by Wissenschaftliche Verlagsgesellschaft M.B.H., Stuttgart. This volume was published by the World Health Organization in English and in French in 1951, and in Spanish in 1954.

NOMENCLATURE AND CLASSIFICATION OF HEALTH PERSONNEL*

The scientific and technological advances of the twentieth century have resulted in an increasing dependence on highly trained professional workers—in no domain more than in health. In general, there is a positive correlation between the degree of a country's economic development and the level of training of its professional workers.

In countries which are as yet " underdeveloped ", partially trained persons are, of necessity, performing tasks which in more-advanced countries would be entrusted only to fully trained workers. This situation should be viewed as temporary, as a stage in the development of such countries.

The classification and nomenclature of health personnel and the training which each group should have in order to perform the functions assigned to it pose problems in comparing the various categories of health workers in different countries. The key chart on the next page is an attempt to aid in solving these problems. It presents a classification general enough to avoid interference with any country's existing system of health services yet specific enough to permit of reasonable comparisons. The classification is based on education and training rather than on job description. It places an auxiliary worker [1] at a certain vocational (and, incidentally, social) level and points the way to improvement of status through further effort and training, whereas classification by job description would give the worker a temporary and uncertain status subject to alteration by assignment to another type of work. Furthermore, from an international viewpoint, a job description in one place would, perhaps, have no comparable meaning in another.

The qualitative scale (horizontal in the key chart) represents some of the standard functions which have been devised for meeting certain human health needs, but there may be some overlapping of functional lines. The categories set out in the key chart emphasize the major, but not exclusive, element in the training of the particular health worker.

In the quantitative scale, presented in a vertical direction, each unit expresses the minimum length of time which a health worker should spend in preparing for his job. The lines which separate the several levels are, in contrast to those between categories, solid and enclosed in the sense that there is no easy ebb and flow between them. Although an individual may move from a lower level to a higher, there are limitations of function which pertain to each level in each category. The scale is arbitrary, but not more so than any numerical grouping. The fact that workers in different columns appear at the same quantitative level does not imply equivalence between them; each column should have the quantitative scale applied to it without comparison with the others.

In the key chart both the expressions " general education " and " technical training " have a broad range of meaning, varying in content, in ratio of theoretical to

* Drawn from an article, published in *Bull. Wld Hlth Org.*, 1955, 12, 411, by Dr. J. L. Troupin, Chief, Section of Assistance to Educational Institutions, WHO. Dr. Troupin was given technical advice in the preparation of the key chart by a number of other WHO staff members: Miss O. Baggallay, of the Nursing Section, Mr. R. N. Clark, of the Division of Environmental Sanitation, and Dr. J. Orkney, of the Maternal and Child Health Section. This article is also to be published, in Spanish, in the *Boletín de la Oficina Sanitaria Pan-americana.*

[1] By " auxiliary health worker " is meant the partly trained or partly qualified person who performs tasks which are generally entrusted to fully qualified, professional workers, not the person, such as a laboratory or X-ray technician, who comes within a professional category considered " ancillary ".

KEY CHART:
NOMENCLATURE AND CLASSIFICATION OF HEALTH PERSONNEL

	MEDICAL	NURSING	PUBLIC HEALTH ENGINEERING	MIDWIFERY
Secondary education plus six years' higher education and technical training	Physician			
Secondary education plus four years' higher education and technical training			Public health engineer	
Twelve years' general education plus three years' technical training	Licentiate doctor	Nurse	Sanitarian—health inspector	Midwife
Eight years' general education plus two years' technical training	Medical assistant			
Six years' general education plus one year's technical training	Medical aide	Assistant nurse	Sanitarian—health assistant	Assistant midwife
"Literacy" plus six months' technical training			Sanitarian—health aide	Midwife aide
"Literacy" plus three months' technical training		Nursing aide		
"Literacy" plus two months' technical training	Medical technician	"Home helper"	Sanitary technician	
No formal training	Tribal or village medicine man			Indigenous midwife

practical, and in attitudes and methods of learning. The "technical training" must necessarily be different for each functional category, though it is important that the compartments should not be watertight. Quantitatively speaking, it is understood that the years spent in study are the best, though at present a crude, measure of extent of education and training.

The nomenclature and classification in this key chart may have some practical application. In countries in which the patterns of training and utilization of auxiliary personnel are already well established, the nomenclature here proposed may represent a convenient vocabulary which the health authorities may use in describing their experiences and services to colleagues in other countries and in comparing their experiences with others'. Where a pattern of health services has not yet been established, the key chart may be useful in planning the first steps, following a study of health conditions, educational status, and social and economic factors to determine the health needs of the population and how they can be met. One country, for example, may decide that it will train a certain number of medical aides each year, because the medical attendant at this level would best fit into its social, economic, geographical, educational, and administrative pattern. In a number of years, in some instances perhaps even in a generation or more, the development of the country may warrant a raising of educational and training standards; and it might then be decided to discontinue the training of medical aides and to turn the educational institutions over to the training of medical assistants, working towards a gradual improvement in training and in the quality of medical services.

Epidemiological and Vital Statistics

A recent number of the *Epidemiological and Vital Statistics Report* [1] contains tables forming part of a series on retrospective data on certain subjects—mainly communicable diseases and causes of death. In this particular number the subject is plague, and data are given on cases of plague reported in various countries and territories of the world since 1921, on deaths from plague in certain countries since the beginning of the century and in other countries since 1921, and on cases of, and deaths from, plague in a number of countries and territories in 1953 and 1954. Also in this *Report* are data on cases of, and deaths from, scarlet fever in certain countries and territories in 1953 and 1954.

Another number of the *Epidemiological and Vital Statistics Report* [2] presents statistics on (1) mortality from tuberculosis of the respiratory system in a number of countries since 1950, (2) deaths from smallpox in certain countries since the beginning of the century and in other countries since 1921, (3) cases of, and deaths from, smallpox in various countries in 1953 and 1954, and (4) cases of, and deaths from, epidemic typhus and other rickettsial diseases in 1953 and 1954.

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[1] *Epidem. vital Statist. Rep.*, 1955, **8**, 1-20
[2] *Epidem. vital Statist. Rep.*, 1955, **8**, 55-80

CONFERENCE FOR THE SEVENTH REVISION OF THE INTERNATIONAL LISTS OF DISEASES AND CAUSES OF DEATH

For more than a hundred years it has been recognized that a standard statistical classification of disease and injury is essential if statistics of the causes of illness and death are to be comparable. Attempts have been made since 1855 to draw up lists of causes of death for international use. The first such list to be generally adopted was the work of a committee headed by Dr Jacques Bertillon, of Paris, and came into use in 1893. Since that date, six revisions of what are known as the International Lists of Diseases and Causes of Death have been made, under the auspices of the French Government.

In accordance with its constitutional obligations, WHO assumed the responsibility for continuing the revision of the Lists and for establishing a statistical classification of diseases, injuries, and causes of death. At the time of the First World Health Assembly, in 1948, the Sixth Revision of the International Lists of Diseases and Causes of Death had been made, and the Health Assembly adopted WHO Regulations No. 1, " regarding nomenclature (including the compilation and publication of statistics) with respect to diseases and causes of death ", the purpose of which was " to ensure as far as possible the uniformity and comparability of statistics of diseases and causes of death " through application of the recently revised Lists.

The *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*, published by WHO in English, French, and Spanish, contained, in addition to the Classification itself, an international form of medical certificate of cause of death and international rules for coding the causes stated on the certificate.

It was thought as well to carry out the Seventh Revision of the International Lists in 1955 so that the revised Manual could be applied in 1958, two or three years before population figures by age and sex are obtained from national censuses, thus making it possible to compute accurate disease-specific mortality-rates for the period around the census date. Accordingly, WHO convened the International Conference for the Seventh Revision of the International Lists of Diseases and Causes of Death in February 1955. Delegations from the governments of twenty-four countries met at UNESCO House, Paris, under the chairmanship of Professeur Jacques Parisot, to consider in detail the revision of the Manual and other subjects related to the International Classification and its use.

The proposed modifications of the Classification are mostly intended to amplify and clarify the existing provisions, actual changes in the categories being kept to a minimum.

Conference participants agreed that the classification of causes of foetal death required further investigation, from both the medical and the statistical points of view, before a substantial revision could be undertaken. It was recommended that certain studies relevant to this problem be undertaken by WHO, and that national administrations able to do so undertake the registration of foetal deaths and of their causes, seek to improve the accuracy of the reported causes, and carry out studies on the certification and tabulation of causes of foetal death and on linking them with causes of neonatal mortality.

It was further recommended that no change be introduced in the present International Form of Medical Certificate of

Cause of Death, but that information on its use be collected by WHO so that the advisability of improving the present form might be considered. Certain revisions were made in the rules for the selection of cause of death for primary tabulation; these were mainly aimed at removing ambiguities and facilitating application. However, the conference recommended that, under WHO guidance, studies of multiple causes of death should be carried out, not only to determine the validity and soundness of the existing rules for classification, but also to give information on conditions which do not appear in single-cause tabulation.

It was also stressed that the Organization should aid in the improvement of morbidity statistics, though it was felt that the time was not ripe to attempt to formulate specific rules for classification of morbidity statistics or to establish a series of additional international standard lists for their tabulation. This, too, was a subject which WHO was requested to study further.

Problems encountered in applying WHO Regulations No. 1 were considered, and it was recommended that the Organization re-examine the Regulations with a view to relaxing the obligations imposed by certain articles.

The Seventh Revision of the International Classification is to be incorporated into the Manual, of which a new edition is to be ready for use from 1 January 1958.

The conference also considered various methods of obtaining information on diseases and causes of death in areas in which application of the International Statistical Classification is impossible for lack of physicians and health services capable of making sufficiently precise diagnoses. It was suggested that WHO establish an expert group to study such methods and co-ordinate the national and regional studies already undertaken.

Other matters discussed at the conference included the training of personnel for coding causes of death, and the education of the medical profession in accurate certification of cause of death; adaptation of the International Statistical Classification to the needs of armed forces; use of the Classification as a diagnostic index; the possible establishment of an international code of surgical operations; the relationship between clinical and autopsy diagnoses; and National Committees on Vital and Health Statistics, to which some of the issues and problems considered at the conference may be referred for study.

International Pharmacopoeia

At its meetings previous to the fifteenth session of the Executive Board, the Standing Committee on Administration and Finance reviewed the distribution and sale of WHO publications, including the *Pharmacopoea Internationalis*. It was reported that about 3800 copies of the English edition and 1640 copies of the French edition of Volume I of the Pharmacopoeia had been sold up to the end of 1954. These two editions were published in 1951; a Spanish edition appeared in 1954. A second volume of the Pharmacopoeia is now in preparation and is expected to be published in the course of 1955.

This, the first international pharmacopoeia and the culmination of efforts begun in 1937 by the League of Nations Health Organisation, is a publication of considerable importance to physicians, pharmacists, and others concerned with pharmaceutical preparations. It contains proposed specifications, nomenclature, symbols and posology for a number of important pharmaceutical preparations. They can be used as a basis in the revision and in the preparation of specifications in the various countries. It is recognized that the International Pharmacopoeia constitutes only a recommendation and is not intended to be a legal pharmacopoeia in any country unless adopted by the national authorities competent in the matter of specifications for pharmaceutical preparations.

Reports of Expert Groups

ADDICTION-PRODUCING DRUGS

The WHO Expert Committee on Drugs Liable to Produce Addiction recommends, in its fifth report,[1] that the following be considered as addiction-producing drugs and therefore subject to the relevant controls : 6-methyldihydromorphine, dihydrohydroxymorphinone, and the synthetic substances 4,4-diphenyl-6-dimethylamino-3-hexanone, 4,4-diphenyl-6-piperidino-3-heptanone, and the isopropyl and other esters of 1-methyl-4-phenylpiperidine-4-carboxylic acid. Two other drugs considered as constituting a risk to public health because of their convertibility to substances liable to produce addiction are the myristyl ester of benzylmorphine and β-4,4-diphenyl-6-dimethylamino-3-heptanol.

The committee drew particular attention to the present status of addiction to pethidine. It considered that an important factor in the increasing tendency to pethidine addiction has been the attitude of physicians towards the drug, based on the widespread but erroneous belief that pethidine is less dangerous than morphine with respect to addiction liability. The committee therefore emphasized the need for the same care in the use of pethidine as with morphine.

Other addiction problems included in this report are the mastication of the coca leaf and the situation concerning *Cannabis sativa*.

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1955, **95**. 16 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

Notes and News

Executive Board: Fifteenth Session

The fifteenth session of the WHO Executive Board was held in Geneva from 18 January to 4 February 1955, under the chairmanship of Dr H. van Zile Hyde. Professor O. Andersen and Professor M. J. Ferreira were Vice-Chairmen ; and Professor J. S. Saleh and Dr H. B. Turbott were Rapporteurs.

The Standing Committee on Administration and Finance met for seven days in advance of the Board's session and on a number of occasions during the session, for a total of sixteen meetings. Dr H. B. Turbott was Chairman of these meetings, at which were considered in detail the proposed programme and budget for 1956.

The Executive Board recommended that the Eighth World Health Assembly accept the Director-General's proposals for the 1956 programme and for a budget of $9 612 000. It also approved and recommended to the Health Assembly the proposed general programme of work for the period 1957-1960, expressing in its resolution appreciation of the support to world health which has been given by governments but calling attention to the " disparity between the resources which have so far been available to the Organization

and the increasingly expressed needs of governments for assistance in strengthening their health services ".

One of the important decisions of the Board concerned WHO's role in promoting the peaceful uses of atomic energy and protecting workers and the general public against atomic radiation. As noted on page 133 of this number of the *Chronicle*, this question became an urgent one following the resolution on international co-operation in developing the peaceful uses of atomic energy which was adopted by the General Assembly of the United Nations at the ninth session.[1] The Board recognized that developments in the application of atomic energy will undoubtedly influence the Organization's work; welcomed the invitation of the General Assembly to participate in the international conference on atomic energy; endorsed the preliminary action taken by the Director-General in calling together a consultant group and submitting a note, through the Secretary-General of the United Nations, to the advisory committee on the conference; requested that the Director-General continue to co-operate with those concerned in preparing the conference and authorized him to take appropriate measures to prepare WHO's contribution to the conference; and requested the Director-General to follow developments in the establishment of an International Atomic Energy Agency with a view to ensuring the Organization's co-operation with such an agency.

Another public health problem which was given much consideration was the implication for malaria control of the development in anophelines of resistance to residual insecticides. The Board examined the relevant recommendations of the XIV Pan American Sanitary Conference (sixth session of the Regional Committee for the Americas) and of the Second Asian Malaria Conference and recommended for adoption by the Eighth World Health Assembly a resolution in which attention is drawn to " the potential danger of a development of resistance to insecticides in anopheline vector species " and governments are requested to "intensify plans of nation-wide malaria control so that malaria eradication may be achieved and the regular insecticide spraying campaigns safely terminated before such resistance occurs ".

Special mention was made of environmental sanitation as a fundamental part of public health programmes. The Director-General was requested " to draw the attention of Member States to the necessity, particularly in developing countries, of giving priority to both short- and long-term planning in environmental sanitation in their annual programmes and budgets in public health ". Other programme items which were subject to some discussion were the Organization's initiation of work on poliomyelitis research; provision in the programme and budget for 1956 for the services of a dental health officer; and the convening, together with FAO, of " a conference of representatives of national committees or similar groups now working on food additives, together with representatives of intergovernmental or non-governmental groups concerned with the subject ".

Upon recommendation of the Standing Committee on Non-Governmental Organizations, a number of non-governmental organizations were admitted into official relations with WHO: the International Union for Health Education of the Public, the International Hydatidological Association, the International Society of Criminology, the International Society for Blood Transfusion, and the International Organization against Trachoma.

At this session the Board studied a report on programme analysis and evaluation, presented by the Director-General, and forwarded this report, as its report, to the Eighth World Health Assembly. It recommended to the Health Assembly that the subject of the next organizational study be " the question of programme planning with particular reference to the integration of preventive and curative medicine in the public-health programme ".

The work of the Standing Committee on Administration and Finance and of the Execu-

[1] This resolution is reproduced in Annex 5, Appendix 2, of *Off. Rec. Wld Hlth Org.*, **60**.

tive Board at its fifteenth session is covered in detail in two volumes of the *Official Records of the World Health Organization* —No. 60, which contains the resolutions of the Board and the organizational study, and No. 61, which consists of the report on the proposed programme and budget estimates for 1956.

Symposium for Sanitary Engineers

From 31 March to 7 April, a group of thirteen European authorities on sanitary engineering met in London and Oxford, under the auspices of the WHO Regional Office for Europe, to discuss their profession, particularly from the standpoint of training. In preparation for this meeting, Professor Milivoj Petrik, of Zagreb, Yugoslavia, made a survey of teaching and training facilities for sanitary engineers in Europe. Despite the urgent need for sanitary engineers, opportunities for specialized training in Europe are extremely limited; and existing facilities have been created only fairly recently.

The symposium attempted to establish guide-lines for the training of sanitary engineers in the light of the major sanitation problems, such as provision of safe drinking-water and disposal of wastes.

Malaria Training Course in the French Cameroons

Under the joint sponsorship of the French Government and WHO, a training course in malaria control was given in Yaoundé from 17 February to the beginning of April. This course was for doctors interested in the " social prevention of malaria in rural Africa ". It was directed by Dr H. G. S. Morin, WHO Malaria Consultant in charge of the pilot project in malaria control which is under way in the area around Yaoundé. Other lecturers included Professeur H. Galliard, of the Faculté de Médecine of Paris ; Professor C. Trincao, of the Malaria Institute of Lisbon ; Dr L. J. Bruce-Chwatt, of the Malaria Service of Nigeria ; Dr I. H. Vincke, Directeur de la Section d'Etudes et de Recherches anti-malariennes, Services médicaux de la Province du Katanga (Belgian Congo) ; Dr M. Vaucel, Inspecteur général des Instituts Pasteur d'Outre-Mer ; and Dr E. J. Pampana and Mr J. N. Lanoix, from WHO Headquarters.

The course consisted of a series of lectures followed by laboratory work and practical demonstrations, using the pilot project in and around Yaoundé for the latter. Among the subjects covered were entomology, haematology, protozoology, the epidemiology and control of malaria, and ethnology and health education in relation to malaria control. Emphasis was on the control of the vector species common in rural Africa.

Similar WHO-sponsored courses in malaria control have been held in Italy, Portugal, and Nigeria.[2]

Nutrition Survey in Egypt

A survey of nutrition in Egypt by three WHO consultants has revealed that anaemia is the cause of more ill health than pellagra. This may be attributed to the prevalence of parasitic infections.

In a study made during one of the seasonal peak periods of the incidence of nutritional diseases, the WHO consultants visited towns, villages, schools, hospitals, out-patient clinics, and maternal and child health centres in various parts of Egypt. While only one case of pellagra was found in the schools surveyed, in endemic disease hospitals and their out-patient departments pellagra was present in about 20% of new cases. The disease was discovered to be most prevalent in areas in which maize is the chief cereal eaten, although it was found almost everywhere, the overall incidence averaging 0.5%.

Anaemia, however, seemed prevalent among both wheat- and maize-eating populations. The groups most affected are pregnant women and children in the ages between weaning and puberty.

The WHO consultants recommended that maize be enriched with niacin and iron at the

[2] See *Chron. Wld Hlth Org.*, 1955, 9, 82.

village mills or that the Government subsidize the exchange of village maize for wheat enriched with iron. Both approaches might be tried out in selected areas and then checked eighteen months to two years later to determine which was the more satisfactory.

As part of its continuing aid in the improvement of nutrition in Egypt, WHO intends to provide a consultant to assist the Government in planning a nutrition institute.

Venereal Disease Treatment at Ports

In a circular letter to Member States, the Director-General has requested that governments inform the Organization of any changes which they wish to make in the *International list of venereal-disease treatment centres at ports*, the most recent edition of which was published in 1951. The List, which is a result of the Brussels Agreement of 1924 providing for free treatment in the major ports for seafarers suffering from venereal infections, is to be revised and brought up to date during 1955. The Director-General has asked that all communications concerning it be sent in time to reach him not later than 1 July 1955. More than three thousand copies of the List have been distributed or sold to health administrations, port medical officers, shipping companies, and other interested organizations and persons.

Governments have also been requested to co-operate in a study of treatment methods and other aspects of venereal disease control at ports. To this end a questionnaire has been sent for completion by medical officers and other physicians in charge of the venereal-disease-treatment facilities included in the International List. This study of venereal disease control among seafarers is being made in accordance with recommendations of the Joint ILO/WHO Committee on the Hygiene of Seafarers and the WHO Expert Committee on Venereal Infections and Treponematoses.

Exchange of Medical Publications

WHO is now acting as agent for the free distribution and exchange of surplus publications between medical institutions throughout the world. The Organization informs medical libraries in Member States concerning the availability of medical books and periodicals offered by libraries in other countries. It does not itself collect and make shipments of publications but is simply acting as a central information service for medical libraries wishing to exchange and distribute books and periodicals. All shipments are made directly from one medical library to another, after agreement has been reached on the specific items required and on the question of transport costs.

Through its Library and Reference Services, WHO is already in touch with many medical libraries throughout the world. It will be glad to receive from new libraries offers of exchanges, accompanied by lists of the most needed publications.

Review of WHO Publications

The Rural Hospital: Its Structure and Organization. By R. F. Bridgman. Geneva, 1955. (*World Health Organization: Monograph Series*, No. 21) 162 pages. Price: £1, $4.00, or Sw. fr. 12.— (clothbound).

While the hospital's sole function used to be to provide hospital care for the sick, there is now a tendency to expand its scope to cover the whole community, through out-patient and preventive medical services. The rural hospital may, in addition, extend its activities to include health education and to serve as a demonstration centre for general hygiene work. This concept of combined health activities can be expressed in the creation of hospital/health-centres responsible for safeguarding all aspects of the population's health. Such an institution is described in this monograph by Dr R. F. Bridgman, Deputy Director of Health of the Department of the Seine, France, and Chief Inspector of Health, who addresses his work particularly to countries that do not as yet possess a hospital network or that may find it possible to adapt their present establishments to the newer ideas.

After having placed the rural hospital within the framework of a general hospital organization and having emphasized the necessity for flexibility of functions, the author deals with the practical aspects of his subject. One chapter is devoted to the structure of the hospital, that is, to the various services which it may comprise—medical, maternity, paediatric, surgical, communicable disease, tuberculosis, mental health, occupational health, and health education, it being obvious, of course, that every rural hospital will not have every service. Dr Bridgman then goes on to examine the architecture and equipment of the rural hospital, giving some suggested plans. Architecturally, hospitals should be designed so that they can be adapted to developments in the health situation. Buildings must be simple and as little mechanized as possible since qualified personnel for on-the-spot repairs may not be available.

In general, the quality of treatment will depend more on the staff than on the premises, and a chapter of the monograph is therefore devoted to personnel—medical, nursing, technical, and administrative—and to the organization of the work.

In a final chapter entitled " From theory to practice ", the author discusses the manner in which rural hospitals can be integrated into the general hospital system of a country or a region and the means of financing hospitals. He considers the types of organization suitable for primitive regions in tropical zones, for under-developed regions with dense agricultural populations, for regions in the course of economic development, and, finally, for rural regions which might be termed " advanced ".

The author's extensive knowledge of hospital organization in widely differing regions of the world and the thorough study which he has made of the rural hospital give weight to his assertion that " the rural hospital is an essential element in evolving a health programme, and has proved to be the most rational means for improving the physical and social condition of country dwellers. It is the instrument of any comprehensive health policy and one of the indispensable stages in any scheme for the economic improvement of rural areas."

Bulletin of the World Health Organization, 1955, **12**, No 4 : number on virus meningo-encephalitis and poliomyelitis. 200 pages. Price : 10/-, $2.00, or Sw. fr. 6.—. Articles in English or in French, with résumé in the other language.

The importance of a number of virus diseases as causes of human morbidity and mortality is receiving increasingly wide recognition. This is doubtless due in part to the fact that the effective control of epidemic bacterial diseases has left the uncontrolled virus diseases relatively more prominent. But it is also due to improved diagnosis and reporting and, for some diseases, to an undoubted increase in their actual incidence.

These trends are well illustrated in the articles published in this number of the *Bulletin of the World Health Organization*. Various aspects of two virus diseases which may easily be confused are described—an arthropod-borne virus meningo-encephalitis and poliomyelitis.

The first series of papers on meningo-encephalitis describes in detail a disease which has only recently been recognized in Central Europe, although it appears possible that it may have been present for many years. A large outbreak in 1953 presented an opportunity for an international study of the disease, in which workers in Austria, the Netherlands, the United States of America, and Yugoslavia took part. Its epidemiology, virology, and clinical aspects have been studied in detail, and it is clear that it falls into the group of encephalitides comprising Russian spring-summer encephalitis and louping-ill. There is evidence that it is arthropod-borne, but the actual vectors and reservoirs have not yet been finally identified.

This work, together with previous observations by Czech and Russian workers, suggests that similar strains of virus are widespread in southern parts of Central and Eastern Europe. However, further serological surveys of both human and potential animal reservoirs are needed to determine the extent of the endemic area.

An interesting and important observation in the clinical field is that in a number of cases it was impossible to distinguish this disease on clinical or pathological grounds from poliomyelitis. The correct diagnosis can only be made with certainty in the virus laboratory. The importance of laboratory diagnosis of virus diseases is made further apparent in an article on poliomyelitis in 1953, in which a study is made of the types of virus responsible for outbreaks of poliomyelitis. The results of some 2200 isolations of the three recognized types of poliovirus are reported, but a surprisingly large number of other viruses have been isolated from cases of clinical poliomyelitis, both paralytic and non-paralytic, which cannot be neutralized by type-specific poliovirus serum. The significance of these viruses is still obscure, but it is evident that further studies are needed both of these agents and on the etiology of clinical illness resembling poliomyelitis in which there is serological and virological evidence that poliovirus is not the causative agent.

Two other papers on poliomyelitis describe the recent severe outbreaks in Israel and the results of a study of the state of immunity of the various population groups in that country. The special epidemiological circumstances arising from the emergency movements of large population groups bring to light a number of interesting points, perhaps one of the most important being the danger of severe local outbreaks resulting from the crowding of susceptible infants.

Inventories of apparatus and materials for teaching science. Volume III, technical colleges, Part 5, medical sciences, UNESCO, Paris, and WHO, Geneva, 1954. 191 pages. Price : 15/6, $2.75, or Sw. fr. 9.50.

To aid medical teaching institutions in selecting essential equipment for courses in the basic medical sciences, WHO has prepared lists of materials for use in teaching the relevant subjects, which form part of a UNESCO series of inventories of apparatus and materials for teaching science at all levels.

The primary purpose of publishing such inventories is to help in implementing plans for adequate teaching of science in schools and colleges in war-damaged and underdeveloped regions, but a second end is also served—that of promoting a certain amount of " uniformity " in course content, or at least an approximate comparability in the standards of teaching in various countries of the world, to bring about " equivalence " of degrees and diplomas irrespective of the universities and institutions where they are awarded.

" Uniformity " and " equivalence ", in this instance, do not imply that educational institutions should be alike in all respects. In fact, in the case of medical schools, their courses should reflect the health needs and resources of their own country. However, certain guide-lines may be useful as a starting point for the establishment or reorganization of certain departments or for setting up new teaching institutes. These inventories of teaching apparatus and materials indirectly provide such guide-lines.

The inventories do not represent the opinion of one individual specialist in each subject but are the result of the collaboration of 129 professors in 92 medical schools.

The lists of equipment are grouped under seven headings, according to subjects or combinations of subjects : (1) anatomy and histology, (2) physiology, (3) biochemistry, (4) pharmacology, (5) bacteriology, (6) morbid anatomy, and (7) preventive and social medicine (hygiene and public health). Each list is preceded by an introduction in which the content of the subject course is considered and the criteria of the choice of equipment specified. These introductions contain much information of a general and practical nature on the teaching of undergraduate medical courses.

The inventories relative to courses in preventive and social medicine take into consideration the fact that different syllabi will be required in different countries, depending upon the stage of development of the public health services of the country. Accordingly, three courses are outlined : one in which the approach is chiefly through environmental hygiene and sanitation ; a second in which greater emphasis is placed on epidemiology, maternal and child care, and the organization of preventive health and medical services ; and a third in which the aim is to teach the elements of social pathology and the methods of application of socio-medical and medical services to a population.

It is envisaged that further editions of these inventories will be published, in which may be incorporated the suggestions and constructive criticisms which this first edition will have elicited and the changes which advances in scientific knowledge and in teaching methods will have made essential.

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